

EXECUTIVE SUMMARY

King County and the City of Seattle have developed the Denny Way/Lake Union Combined Sewer Overflow Control Project (Denny/Lake Union Project) to reduce combined sewer overflows (CSOs) from south, east, and west Lake Union and from the existing Denny Way CSO on Elliott Bay in Myrtle Edwards Park. The County and City are working together to prepare an efficient and cost-effective project that makes the best long-term use of existing and planned facilities in the subbasins. The resulting discharge quantity and quality will meet all current state requirements and exceed federal requirements for CSO control.

The final State Environmental Policy Act Supplemental Environmental Impact Statement/National Environmental Policy Act Environmental Assessment (hereinafter referred to as final joint document) for the Denny/Lake Union Project evaluates two action alternatives to control CSOs in south, east, and west Lake Union and from the Denny Way CSO. It also evaluates a no action alternative. Alternative 1 - CSO Storage and Treatment (the Preferred Alternative) has been selected for final design. This executive summary provides an overview of the proposed Denny/Lake Union Project. Alternatives receiving analysis are described and key impacts and mitigation measures related to the construction and operation of the project are identified.

CHAPTER CONTENT

Chapters 1, 2, and 3 of the document provide an introduction and summary, project background, and alternatives description for this project. Chapter 4 characterizes existing conditions for the Denny Basin, the project area for this document. The Denny Basin is a large urban area within the City of Seattle (Seattle) served by combined sewers. Existing conditions are characterized for two subbasins within the Denny Basin: the South Lake Union Subbasin and the Elliott Bay Subbasin. Chapters 5 through 9 address short-term (construction), long-term (operation), and cumulative impacts for the project. Chapter 10 identifies mitigation measures. Chapter 11 describes the public involvement process, and Chapter 12 includes the distribution list. Additional detail associated with the environmental review for this project is included in the appendices at the end of the document.

PROJECT NEED

Existing System

Much of Seattle is served by a combined sewer system rather than separate sanitary and storm sewers. During wet weather, when the volume of sanitary sewage and stormwater entering the combined sewers exceeds the system capacity, the system is designed to overflow at several designated CSOs.

Operation of the wastewater conveyance system in the western portion of the Denny Way/Lake Union drainage basin is shared by the County and the City. Both systems discharge CSOs from this drainage basin into Lake Union. In addition, the County owns a major CSO facility that discharges into Elliott Bay at the Denny Way Regulator Station in Myrtle Edwards Park. Currently, CSO discharges occur at

this location about 50 times per year, resulting in an annual average discharge volume of 405 million gallons (MG).

King County's existing wastewater conveyance and treatment system serving the Denny Basin project area consists of a wastewater treatment plant at West Point, the Elliott Bay Interceptor (EBI), the Interbay Pump Station, the Denny Way Regulator Station and Outfall, the Lake Union Tunnel, the Central Trunk, and the Dexter Regulator Station. The City's system consists of a new interceptor pipeline beneath Fairview and Eastlake avenues on the east side of Lake Union.

Regulatory Requirements

Ecology has adopted a number of regulations pertaining to municipal waste discharges, including CSOs (WAC Chapter 173-245). The regulations require that CSOs be controlled "such that an average of one untreated discharge may occur per year." In addition, CSO treatment is defined as being the equivalent of primary treatment.

King County staff and consultants have met with Ecology staff to discuss the proposed Denny/Lake Union Project and how it complies with state regulations. The project would function as a storage and transfer project during most storms, with flows transferred to the West Point Treatment Plant once capacity is available. At the West Point plant, the flows would generally receive secondary treatment. On average, about 50 percent of the annual CSO volume that enters the tunnel would be transferred to West Point.

During larger storms, flows from the tunnel would be treated at the Elliott West CSO Control Facility and discharged through the Elliott West Outfall. Floatables would be removed, and these flows would be disinfected and dechlorinated. During the largest storms (on average, once per year), flows would exceed the pumping capacity of the Elliott West facility, and there would be discharge of untreated CSO through the new outfall extension at the Denny Way Regulator Station.

Ecology has concurred informally that this combined approach, using both CSO storage/transfer and at-site treatment, appears to meet applicable state regulation. Through the National Pollutant Discharge Elimination System (NPDES) permitting process, the state would establish monitoring and reporting requirements for the future facilities. In NPDES permits for other CSO facilities in the King County system, Ecology has considered the treatment received by all flows entering a CSO facility on an annual basis by giving credit for actual pollutant removal at the West Point plant for CSOs transferred there. The proposed Denny/Lake Union Project would operate in much the same fashion, by transferring approximately half the annual volume to the West Point Treatment Plant, where the flows would usually receive secondary treatment.

PROJECT OBJECTIVES

The Denny/Lake Union Project has been initiated to meet all current federal and state requirements for control of the City of Seattle CSO discharges into Lake Union and control of the County's Dexter CSO to Lake Union and the Denny Way CSO to Elliott Bay. The project has been developed jointly by the County and City because of the close relationship between the two systems in the Lake Union and Denny Way areas. Although the City and County could have addressed their CSOs in separate projects,

independent solutions might have aggravated problems for the other jurisdiction and likely would have resulted in higher total costs for ratepayers. Therefore, the County and City worked cooperatively on a feasibility study for a combined project in the early 1990s and signed a Memorandum of Agreement in 1995 to jointly implement a multi-phase project to address these issues.

ALTERNATIVES

This document evaluates two CSO control alternatives and a no action alternative. Both control alternatives reduce CSOs to the Lake Union outfalls and Denny Way CSO to one untreated overflow event per year. Both alternatives apply the concept of CSO storage and treatment prior to discharge into receiving waters. Alternative 1 achieves CSO reduction through storage and treatment of flow volumes generated from the existing combined sewer system. Alternative 2 incorporates a stormwater separation element, discharging separated stormwater to receiving waters, and storing and treating remaining CSOs. Alternative 3, the No Action Alternative, would continue to discharge CSOs to Lake Union and Elliott Bay at current rates.

Because Alternative 1 meets all the project objectives at a lower overall treatment cost per gallon, it has been selected for final design. Alternatives are described generally below. Figures and specific information about facilities for each alternative are included in Chapter 3 and Appendix Q. Table ES-1 lists proposed facilities and specifications for the alternative selected for final design, Alternative 1.

Selected Alternative: Alternative 1 - CSO Storage and Treatment (the Preferred Alternative)

Alternative 1 would achieve CSO control for Lake Union and Elliott Bay through the following measures:

- ◆ Connection with improved City system. The City's improved conveyance facilities on the south and east sides of Lake Union would be connected to convey storm flows to the new County system.
- ◆ South Lake Union Area Conveyance Facilities. Two diversion/regulator structures and three 54- to 84-inch-diameter pipelines to convey flows to a new Mercer Street Tunnel. Elimination of the City's CSO #175 and 12- to 30-inch diameter pipelines to convey CSO #175 flows into the already constructed Phase 1 pipeline. Elimination of the City's CSO #125.
- ◆ Mercer Street Tunnel. An approximately 6,200-foot-long, 14- to 16-foot-inside-diameter storage tunnel extending westward beneath Mercer Street from a point near the intersection of Roy Street and Eighth Avenue North to Elliott Avenue West. The storage capacity of the tunnel would be approximately 7.2 million gallons (MG).
- ◆ Elliott Bay Area Conveyance Facilities. Two diversion/control structures and three 72- to 108-inch-diameter pipelines to convey flows to and from the new tunnel.

Table ES-1
Proposed Facilities and Specifications

Facility	No. of Units	Type	Size/Capacity
South Lake Union Facilities			
Lake Union Tunnel Regulator		Rein. Concrete	
Lake Union Tunnel CSO Pipeline			72- to 84-in. dia., approx. 700 ft long
South Lake Union CSO Pipeline		Concrete	72- to 84-in. dia., approx. 900 ft long
Valley Street Connection			60- to 72-in. dia., approx. 800 ft long
Central Trunk CSO Pipeline			54- to 84-in. dia., approx. 300 ft long
Denny Way Conveyance Facilities			
Elliott Bay Interceptor Control Structure		Rein. Concrete	
Elliott West CSO Pipeline			72- to 84-in. dia., approx. 2600 ft long
Elliott West Effluent Pipeline			96- to 108-in. dia., approx. 3000 ft long
Dechlorination Pipeline			2-in. dia., approx. 3100 ft long
System Drain		Gravity Flow	84- to 96-in. dia., approx. 300 ft long
Mercer Street Tunnel			
Tunnel			Length: 6200 ft Diameter: 14- to 16-ft Storage Capacity: 7.2-MG Liner: Concrete
Ventilation and Odor Control (East End)		Activated carbon	4.6 air changes/hr (nonstorm) 10 air changes/hr (storm)
Elliott West CSO Control Facility			
Pump Station			174,000 gpm
Wet Well/Dry Well Pumps	6	Variable speed	29,000 gpm (ea)
Effluent Channel and Floatables Control		Fixed screens	
Disinfection Facilities (sodium hypochlorite)	2	Tanks	5,500 gal. (ea)
Dechlorination Facilities (sodium bifulfite)	2	Tanks	5,500 gal. (ea)
Ventilation and Odor Control (CSO Control Facility)		Activated carbon	12 air changes/hr
Electrical Power Supply			
Main Supply		Broad Street Substation	2.5-3 MW
Emergency Supply	1	Generator	150 kW
Outfalls			
Elliott West Outfall			Length: 490 ft Discharge Depth: 60 - 70 ft MLLW* Diameter 96- to 108-in
Denny Way CSO Outfall Extension			Length: 90 ft Discharge Depth: 10 - 20 ft MLLW* Diameter 96- to 120-in

This table is intended to summarize facilities described in Chapter 3 and Appendix Q. Pipeline and tunnel lengths are rounded to the nearest 100 feet.

*Range of discharge depth is intended to cover top of pipe, bottom of pipe and invert.

- ◆ Elliott West CSO Control Facility. A 250 million gallons per day (mgd) pump station and CSO treatment system located at the west portal of the tunnel to provide removal of floatables, disinfection and dechlorination.
- ◆ Two Outfalls. A new, 96- to 108-inch-diameter outfall to discharge treated effluent into Elliott Bay at a depth of 60 to 70 feet mean lower low water (MLLW); and a 96- to 120-inch-diameter extension of the existing outfall to discharge untreated CSO at a depth of approximately 10 to 20 feet MLLW during the one discharge per year when flows exceed the system capacity.

Not Selected: Alternative 2 - Partial Separation and Storage

Alternative 2 would achieve CSO control for Lake Union and Elliott Bay through the following measures.

- ◆ Installation of new storm sewers throughout the drainage subbasins.
- ◆ Discharge of separated stormwater from west and south Lake Union to the lake through a new outfall.
- ◆ Discharge of separated stormwater from lower Queen Anne and Denny Regrade areas to Elliott Bay through four new stormwater outfalls.
- ◆ Connection with improved City conveyance facilities.
- ◆ Storage of remaining flows in storage tanks located in south Lake Union and on the Elliott West site for transfer to the West Point Treatment Plant.
- ◆ Discharge of untreated flows (projected at one per outfall per year) from the new south Lake Union outfall or existing CSO outfall.

Not Selected: Alternative 3 - No Action

Under the no action alternative, no new CSO facilities would be constructed in either the South Lake Union or Elliott Bay subbasins. Discharge of CSO volumes would continue at current rates and projected increases.

IMPACTS AND MITIGATION MEASURES

Overall, Alternative 1 or 2 of the Denny/Lake Union Project would result in reduction of CSOs to Lake Union and Elliott Bay and would contribute to improved water quality over the long-term. No significant construction or operation impacts have been identified which cannot be mitigated. However, Alternative 2 would result in more impacts over a larger area than Alternative 1. A summary of impacts and mitigation is included at the end of this chapter in Table ES-3.

Short-term impacts identified with implementation of this project are construction-related and include impacts to area noise levels, transportation, air quality, utilities, environmental health, biological resources, water quality, and land and shoreline use. Construction of facilities would result in a temporary increase in noise levels, increased congestion along roadways, increased levels of fugitive dust and fumes, temporary disruption of utilities, disturbance of shorelines and park use, increases in sedimentation and turbidity, and displacement of some aquatic and wildlife species due to excavation

and noise. Outfall construction could disrupt contaminated sediments underlying and shoreward of the Denny Way Sediment Cap and could re-introduce these sediments into the water column.

Long-term impacts associated with operation of the project include potentially beneficial impacts to fisheries, shellfish, and plant and animal habitat resulting from reduced CSO volumes and frequency to Lake Union and Elliott Bay. Long-term adverse impacts include a potential localized decrease in biological activity in the immediate vicinity of outfalls and loss of potential public access on a street right-of-way.

Mitigation measures focus primarily on reducing construction-related impacts. For example, measures such as erosion control best management practices; implementation of construction windows and specified construction hours; prior notification of residents, businesses, and park users; and mitigation plans relating to procedures for dewatering, spill prevention, and handling of contaminated soils are identified to reduce impacts for Alternatives 1 and 2. Mitigation measures specific to Alternative 1 relate primarily to the design and construction of the new outfall and outfall extension into Elliott Bay. Placement of pilings through the Denny Way Sediment Cap would occur in compliance with the National Oceanic and Atmospheric Administration Consent Decree and the Puget Sound Dredged Disposal Analysis. Mitigation measures specific to Alternative 2 involve siting and construction of stormwater outfalls. Discharge of stormwater would occur in compliance with the Washington Department of Ecology (Ecology) water quality and sediment standards.

Alternative 3 (the No Action Alternative) would produce no construction or operation impacts, and therefore, no mitigation would be required. However, CSOs would continue to discharge at the current or increased level of frequency and volume.

ENVIRONMENTAL REVIEW

This final joint document has been prepared by King County and Seattle to meet the requirements of and prepared in accordance with the State Environmental Policy Act (SEPA) (RCW 43.21C), the SEPA Rules (WAC 197-11), King County SEPA procedures (Chapter 20.44 King County Code), the National Environmental Policy Act (NEPA) (42 USC 4321 et seq.), Environmental Protection Agency (EPA) Implementing regulations (40 CFR Part 6), and Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508). King County is the SEPA lead agency for the Phases 2 and 3/4 SEPA Supplemental Environmental Impact Statement (SEIS) with the City of Seattle as a cooperating agency. EPA is the NEPA lead agency for Phases 2 and 3/4 for the NEPA Environmental Assessment (EA).

This final joint document is part of separate King County and Seattle “phased” environmental review processes. This document is a supplement to the documents listed in Appendix A and incorporated by reference in this document. It is also the project-level analysis for the Denny/Lake Union Project which analyzes project-specific significant environmental impacts of Phases 2 and 3/4 to support the selection of Alternative 1 to reduce CSOs into south Lake Union and Elliott Bay.

The specific elements identified in the alternatives are representative of the components and locations where CSO control facilities might be built. During final design, Alternative 1 may be modified. If the final locations of proposed facilities differ from those considered in the SEPA/NEPA environmental process, King County, City of Seattle, Ecology, and EPA will evaluate the potential environmental

impacts to determine if these alignments or locations will result in environmental impacts that are outside the range of impacts and alternatives considered in the final joint document. As appropriate, additional environmental documents, such as addenda, may be prepared in the future to address impacts not considered in this environmental document.

ESTIMATED PROJECT COSTS AND RATE IMPACTS

Each year, the King County budget process establishes the monetary requirements for the disposal of sewage. These requirements include administration, operating, maintenance repair/replacement, necessary capital reserves, and the requirements of bond resolutions. For 1998 and 1999, the established King County sewer rate is \$19.10 per month per residential customer. This rate captures the impact from all King County wastewater capital projects including the Denny/Lake Union Project and ongoing operating expenditures. The Denny/Lake Union Project receives no money from the State Revolving Fund because these funds cannot be used for CSO treatment. Therefore, there are no impacts related to this fund at present.

Additionally, the project has been awarded a \$35.0 million Infrastructure Grant by EPA. King County and the City of Seattle share this grant, with \$6.5 million reserved for Phases 1 and 2 and \$28.5 million reserved for Phase 3/4. The effect of this grant is described below.

User Rate Impacts for Selected Alternative: Alternative 1 – CSO Storage and Treatment

Table ES-2 summarizes the most probable estimated order-of-magnitude project costs escalated up through the point of award of all of construction contracts (2001). Total estimated project cost including City of Seattle Phase 1 and Phase 2 work is \$164.3 million.

The total rate impact for the preferred alternative for 1999 is estimated to be \$0.02 of the \$19.10 sewer rate, rising to \$0.95 - 1.06 of the total rate by project completion in the year 2004. The EPA infrastructure grant of \$28.5 million (King County's share of the grant) reduces the rate impact of the Denny/Lake Union Project by \$0.07 in 2000 and \$0.27 by the year 2004.

Table ES-3 shows the anticipated rate impact on a year by year basis, both with and without the EPA Infrastructure Grant. This table should not be construed as a user rate forecast; the figures shown only attempt to demonstrate the impact of the Denny/Lake Union Project and the EPA Infrastructure Grant on a year by year basis. The ultimate user rate is comprised of a number of factors, including initiatives such as the Regional Wastewater Services Plan and other projects that may occur many years from now.

Sources of funds for wastewater capital improvement programs include:

- ◆ Contribution from the operating fund (Customer Charges {sewer rate}, Investment Income, Capacity Charge, City of Seattle CSO Charge, and Other Miscellaneous Revenue {Industrial Surcharge Fees, Septic Tank Disposal Fees, Sale Of By-Products, and small amounts of additional miscellaneous contributions})
- ◆ Capital Fund Sources (Proceeds From Bond Sales, Short-Term Borrowing, and Other Capital Revenues {non-operating and capital revenues})

User Rate Impacts for Alternative 2 - Partial Separation and Storage

Table ES-4 shows the probable estimated order of magnitude project cost for Alternative 2, partial sewer separation and storage. This alternative was not considered further due to the excessive construction disruption and ultimate project cost. Total project cost including City of Seattle Phases 1 and 2 is \$309.3 million escalated up through the point of award of all construction contracts (2001).

The total rate impact for Alternative 2 for 1999 is estimated to be \$0.02 of the \$19.10 sewer rate, rising to \$2.07 of the total rate by project completion in the year 2004. The EPA infrastructure grant of \$28.5 million (King County's share of the grant) reduces the rate impact of the Denny Way project by \$0.27 by the year 2004.

Table ES-5 in shows the anticipated rate impact on a year by year basis, both with and without the EPA infrastructure grant.

Table ES-2
Estimated Project Costs
Alternative 1 - CSO Storage and Treatment (the Preferred Alternative)
 (Capital costs in millions of dollars at time of expenditure)

	Phase 1 (Seattle)	Phase 2 (Seattle)	Phase 3/4 (King County and Seattle)	Total Project
<i>Estimated Construction Cost</i> Construction Costs including Contingencies and Sales Tax	\$12.8	\$4.4	\$104.8	\$122.0
<i>Estimated Non-construction Costs</i> Engineering, Administrative and Land/Permit Acquisition Costs	3.2	1.7	37.4	42.3
<i>Most Probable Project Cost</i>	16.0	6.1	142.2	\$164.3
<u>Funding Sources</u>				
King County			94.4	\$94.4
Federal grant	5.2	1.3	28.5	35.0
City of Seattle cost share	10.8	4.8	19.3	34.9
<i>Estimated Annual O&M Costs</i>	\$100,000	\$20,000	\$501,000	\$621,000

Note: Construction cost estimate for Phase 3/4 is based on fourth quarter 1997 dollars (ENR Seattle Construction Cost Index of 6640), escalated to time of construction. The range of accuracy for the Phases 3/4 construction cost estimate is +20% to -15%, thus giving a range of probable construction cost between \$89.1 and \$125.8 million.

Table ES-3
Component Rate Impact
Preferred Alternative - CSO Storage and Treatment (the Preferred Alternative)

	1999	2000	2001	2002	2003	2004
Component Rate Impact without EPA Infrastructure Grant	\$0.02	\$0.18-.22	\$0.43-.52	\$0.67-.80	\$0.88-1.06	\$0.95-1.14
Component Rate Impact of EPA Infrastructure Grant	\$0.00	\$0.07	\$0.17	\$0.26	\$0.27	\$0.27
Net Rate Impact with EPA Infrastructure Grant	\$0.02	\$0.11-.15	\$0.26-.35	\$0.41-.54	\$0.61-.79	\$0.68-.87

Note: Range of rate impacts shows 1) rate with estimated Phase 3/4 construction cost as shown in Table ES-2 (\$104.8 million) and 2) rate with construction cost at high end of range of probable construction costs (\$125.8 million).

Table ES-4
Estimated Project Costs
Alternative 2 – Partial Separation and Storage
 (Capital costs in millions of dollars at time of expenditure)

	Phase 1 (Seattle)	Phase 2 (Seattle)	Phase 3/4 (King County and Seattle)	Total Project
<i>Estimated Construction Cost</i> Construction Costs including Contingencies and Sales Tax	\$12.8	\$6.2	\$220.9	\$239.9
<i>Estimated Non-construction Costs</i> Engineering, Administrative and Land/Permit Acquisition Costs	3.2	1.8	64.4	69.4
<i>Most Probable Project Cost</i>	16.0	8.0	285.3	\$309.3
<u>Funding Sources</u>				
King County			231.1	\$213.1
Federal grant	5.2	1.3	28.5	35.0
City of Seattle cost share	10.8	6.7	43.7	61.2
<i>Estimated Annual O&M Costs</i>	\$100,000	\$20,000	\$1,300,000	\$1,400,000

Note: Construction cost estimate for Phase 3/4 is based on fourth quarter 1997 dollars (ENR Seattle Construction Cost Index of 6640), escalated to time of construction. The range of accuracy for the Phases 3/4 construction cost estimate is +20% to -15%, thus giving a range of probable construction cost between \$89.1 and \$125.8 million.

Table ES-5
Component Rate Impact
Alternative 2 – Partial Separation and Storage

	1999	2000	2001	2002	2003	2004
Component Rate Impact without EPA Infrastructure Grant	\$0.02	\$0.41	\$0.96	\$1.48	\$1.96	\$2.07
Component Rate Impact of EPA Infrastructure Grant	\$0.00	\$0.07	\$0.17	\$0.26	\$0.27	\$0.27
Net Rate Impact with EPA Infrastructure Grant	\$0.02	\$0.34	\$0.79	\$1.22	\$1.69	\$1.80

Note: Range of rate impacts shows 1) rate with estimated Phase 3/4 construction cost as shown in Table ES-2 (\$104.8 million) and 2) rate with construction cost at high end of range of probable construction costs (\$125.8 million).

Table ES-6

Table ES-6 (con't)

Table ES-6 (con't)

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